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# Cost and Hospital Health Services

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**Abstract:** Health production is a process, in which goods, human labor and other costs are involved in and incorporated into the creation of services, directly or indirectly. The total production cost reflects all costs associated with the object, including both direct costs and an appropriately apportioned share of indirect costs. The need to control health care costs (cost-containment) has given rise to common policies attempting to combine cost-effectiveness (efficiency) with managerial efficiency. The choice of the method for cost determination in nursing facilities should take into account the specificities of the healthcare facility, the quality of information available and the intended purpose.

**Key words:** Cost, hospital, health and health services.

## 1. Introduction

While in general, existing methods are related to the way that each country has chosen to finance its health system, the need for cost-containment has led to the emergence of common policies that attempt to combine cost-effectiveness with managerial effectiveness. More specifically, it seeks to combine the way in which health service providers are funded to include elements of the management process that are expected, within the available financial resources, to maximize the outcome [1].

Most financing systems seek to achieve all three simultaneously, although some inconsistencies are sometimes identified in the attempt to achieve them. Success, or failure, is an open question, while the ultimate goal of health policy is to achieve the best possible outcomes by maximizing the criteria [2].

The cost of hospital care is the main factor in the continued rise in spending, accounting for more than 50% of total health care expenditure in developed countries. Moreover, it is generally accepted that the way hospitals are financed directly affects their overall activity (days of hospitalization, average length of stay) and the ability to intervene to control costs. The financing of hospital care, apart from being dependent on the chosen method of financing the health system, is particularly problematic due to the nature of hospital work and the difficulty of estimating the outcome/product [3].

The systems for financing health services are generally distinguished according to the form of social protection of each state. If social protection takes place on a public basis (e.g. UK, Nordic countries, etc.), funding is based on the Beveridge model. In this case, citizens pay taxes to the state, which directly finances the health care system [4].

In the UK, changes in management have focused, inter alia, on the introduction of the clinical management budget for medical departments [5]. Alongside the clinical budget and with the aim of efficient and effective use of resources, the concept of "resource management" is being promoted, which is linked to the development of the clinical budget, the costing of patients and services, i.e. the development

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of IT management systems to support the work of the team of doctors, nurses and other staff [6].

In countries where social protection is based on social health insurance (Germany, France, the Netherlands, etc.), funding is based on the Bismarck model. In this case, the financing of the health care system comes from contributions to health insurance funds, from either employees only, employees and employers, or employees, employers and the state [7].

Finally, in countries where social protection is based on private health insurance, funding is based on the market model. In this case, citizens either pay insurance premiums to private collective health coverage mechanisms operating based on the pay-as-you-go principle, or pay the cost of services provided to health care providers themselves [8].

The prospective version of hospital funding is based on Diagnostic Related Groups and has already been fully implemented in the Medicare (USA) program. This method, in addition to the funding function, combines other elements to support the work of the hospitals. The method is already applied in many European countries [9, 10] and is considered a suitable method for Greece as well. In any case, the primary source of funding remains the same, i.e. the citizen [11].

In Greece, the funding model is considered mixed, i.e. a combination of the social security system/Bismarck and the state system/Beveridge [3].

The purpose of this narrative review is to highlight and present the cost of hospital services.

The research method followed was based on the bibliographic search of review and research studies drawn from the international databases MEDLINE, PubMed, CINAHL and the Greek database Iatrotek, with key words such as cost, hospital, health and health services. The exclusion criterion of articles was the language other than English and Greek.

## 2. Financing of Health Services

There are two main methods of reimbursement of health services that have been developed to date: retrospective and prospective. The former has now been abandoned by all advanced health systems, as it is considered unsuitable for a modern and efficient management of hospitals, since it has been proven to cause an increase in their workload and unduly prolong the length of hospital stays. The second requires a satisfactory level of management in hospitals and a planning-based financial administration [1].

In the International literature on health economics, various methods of financing hospitals are proposed [12]. The main distinction between accounting methods of financing is related to the timing of payment. In general, there are three main methods of calculating the amount of reimbursements. Retrospective, prospective or budgetary (prospective) and mixed [13].

In the first method, the amount of compensation is determined based on the actual costs of the institution, which is determined at the end of each period, i.e. compensation is determined retrospectively based on the hospital's cost performance [14].

The second one determines the cost level of each hospital at the beginning of each period, based on data and criteria, without this being directly linked to actual costs. The determination of these prospective rates is the product of negotiations between the members of the hospitals' management and the members of the insurance companies' management. From its application to date, this method has been evaluated as quite constructive in terms of the financial behavior of the hospital, as well as the development of management skills to achieve financial goals [12].

The work produced by a hospital unit can be calculated using the following methods:

1) Payment per transaction

Each medical/nursing transaction shall be priced separately [11]. It is considered an outdated method, costly and inflationary by the insurance providers, as

it promotes artificial demand for services, resulting in a decrease in the economic efficiency of the health care system. For this reason, this method should be combined with the overall budget [13].

2) Daily hospital allowance

Daily allowance paid to the hospital for each day of hospitalization. The rate includes all diagnostic, therapeutic, administrative and hotel services [13].

3) Total-Closed & Departmental Budget

Covers in total and without any change during the fiscal year, all the planned activities of the organization. At the beginning of the financial year, each department of the hospital has a defined budget, which is part of the central-total budget of the hospital. In this way, the hospital is funded prospectively at the beginning of each fiscal year. Implementing the method requires leaders with well-developed skills and the ability to motivate employees to actively participate in decision-making and goal achievement [13].

4) Homogeneous diagnostic categories (DRGs)

First implemented in the USA in 1983. Their creation was based on two mechanisms: a) identifying hospital services by groups and b) setting a weight or value for each group. The method is now applied worldwide and is recognized as the most advanced practice for costing and reimbursement of hospital services. DRGs are based on the International Classification of Diseases and use, in addition to the initial diagnosis, potential complications, secondary diseases, gender and age of the inpatient, disease severity and average length of stay [14].

The main reasons for the wide acceptance of DRGs are: a) to describe the structure of hospital inpatient burden, b) to facilitate the monitoring of the temporal and geographical evolution of hospital characteristics and c) to facilitate the formulation of health policy based on the results, while considering morbidity, mortality and quality of available resources, resulting in their proper allocation. Finally, standardization serves the state and insurance organizations, which wish to know in advance the cost of the services they are required to purchase on behalf of patients [15].

## 3. Cost of Hospital Services

For the analysis of the cost of hospital services it is useful to clarify definitions, as well as information on costing.

Cost in economics is the incurring of expenditures and the allocation of purchasing power to purchase inputs/resources to create a productive activity to provide goods and services to society as a whole [16]. Any economic expenditure is a cost, but not every cost is an economic expenditure [17].

Hospital costs are defined as the total costs associated with the production and delivery of health services provided within the hospital or its population of responsibility [18, 19]. Costs are also the monetary value of resources consumed in the production or distribution of goods or services.

In the health sector, these resources include human resources, consumables, basic equipment, capital costs and the costs of support functions. Resources (inputs) using various services i.e. the hospitalization of patients - produce treatments (outputs). Costs in hospital units depend on a number of accounting factors [20, 21] such as:

- Hospital size: Costs are affected by the area covered, facilities, technological equipment and available beds.
- Level of population coverage: Each health facility covers a geographically specific population. As the population of the area of responsibility increases, the range of people seeking health services widens. A critical parameter is the density of housing in the area of responsibility.
- Legal form: Whether its character is profit-making or not. Health units are legal entities, like all other companies. It should be clarified that the purpose of a private for-profit health unit is to maximize profit through the provision of health services. In contrast, the purpose of a public-law entity is to provide

services to meet the needs of the population within the framework of a planned budget.

- Average length of stay in hospital: In Greece, the cost of hospitalization is mainly covered by insurance funds, with a specific amount per day of hospitalization (closed hospitalization). In cases where invasive medical procedures are deemed necessary, the cost of hospitalization is inflated in the first few days after the operation. Conversely, in cases where conservative treatment is required, the hospitalization costs are lower.
- Employment and human resource management policy: The costs of a hospital - and of a business in general - are influenced by the salaries, the type of employment contract of its employees and the contract rules set by the state.
- Hospital Population Spectrum: The type of disease affects the cost of treatment. For example, the cost of treating a case of influenza is different than the cost of treating a case of cancer. Chronic diseases also imply a constant consumption of health services.

## 4. Types of Costs

The types of costs include the following [21]:

- ✓ Direct: Includes costs directly related to hospitalization, e.g. salaries of physicians and other clinical/nursing staff, drugs, other materials. Conceptually, it includes elements of both direct and indirect costs when it comes to healthcare costs in the ICU.
- ✓ Indirect: Includes the cost of all the above-mentioned input factors used for the same patient in the hospital's other cost centers (other departments - diagnostics - within the same hospital).
- ✓ Immaterial: Not related to financial resources. Unlike direct and indirect costs, it is not measurable. It refers to outcomes that cannot be measured, only estimated (e.g. pain and distress that accompany healthcare procedures).
- ✓ Fixed: It is the sum of staff salary costs and the cost of operating and maintaining the department and equipment (cleaning, electricity, medical gases, air conditioning, etc.).
- ✓ Variable: Expenditure on drugs, blood products, consumables, laboratory and imaging tests (a subset and part of direct expenditure when talking about healthcare expenditure in the ICU).
- ✓ Budgeted: The costs that are projected to be required by the end of the patient(s)' or an entity's hospital stay.

## 5. Basic Principles and Techniques of Costing

The basic principles of costing in hospitals are as follows [18]:

- ❖ Coding using analytical accounting (analysis of accounts by cost centre and cost category)
- ❖ Categorization by cost centre. A cost centre is defined as any part of an organization that causes or is the cause of cost generation. The costs charged to each cost centre should be related to it.
- ❖ The categorization into direct and indirect costs could be based on who incurs the cost. For example, direct costs are borne by the insurance fund, while indirect costs (loss of income, etc.) are borne by the patient.
- ❖ First, the cost centres should be identified and then the elements included in each cost category.

## 6. Costing Techniques

The following costing techniques are used internationally [20, 21]:

✧ Marginal costing technique

Marginal costing is based on the separation of fixed and variable costs. The characteristic of the technique is that variable costs are borne by the cost units, while fixed costs are fully amortized against their total contribution. In particular, it includes the cost factors that vary with changes in production volume (raw material costs, direct labour costs and variable

overheads). Fixed overheads are not charged to the cost of production but are considered as period costs and are charged directly to the financial results.

✧ Total absorption costing technique

Analysis based on overall product, using fixed rates per input/output with accounting data. Specifically, costs consist of raw materials, direct labor and overheads (fixed or variable). Overheads are divided into direct and indirect costs. The former can be allocated directly to a cost centre, while the latter are charged indirectly to the cost centre through the technique of allocation to cost centres.

✧ Standard cost

The standard cost method generates reference costs. The methodology requires the estimation of all activities and the associated costs of each service. In order to carry out standard costing, standards for raw materials, direct labor and overheads must be established. In particular [22]:

a. The standards of raw materials, determined by quantities and prices.
b. Standards for direct labor, relate to employee performance (determination of time required to produce a unit of product) and hourly wage (degree of human resource specialization), in conjunction with wage rates policy, collective bargaining agreements, etc.
c. Overheads are divided into fixed and variable costs. Healthcare facilities should describe all categories of resources used in each activity, such as: personnel (medical, nursing, paramedical, administrative, technical), equipment, laboratory supplies, other consumables, clinical services from other departments/clinics and overhead [23].

➢ Costing of diagnostic categories/DRG's

Homogeneous diagnostic categories describe the composition of inpatients and bed coverage of each diagnostic category in a health facility or across a health district. With DRG's we can understand the type of patients that fall into each category, as well as their differentiation in terms of resource utilization. Each diagnostic category does not imply a specific cost for each patient who is included in it. Instead, costs vary according to the amount and type of resource used for treatment. Another factor that determines the cost of treatment is the length of hospitalization. In this case, part of the cost (indirect/capitation) is shared proportionally, per day of hospitalization, to all inpatients [21].

Costing of diagnostic categories is used to extract information useful for the budget of each hospital department, since knowledge of the cost of each case, combined with knowledge of the previous financial year's activity, can be used to determine the next period's targets. It also helps in determining the costs in case of creating new departments or expanding the existing [24].

Finally, DRG's are a key tool for health facility managers, making it possible to compare the costs of each diagnostic category in different hospitals and assess their differences. They can also contribute to bench marking based on cost-effectiveness and cost-efficiency analysis [25].

## 7. Conclusions

Health production is a process in which materials, human labor and other inputs are involved and integrated in the production of services in a direct or indirect way. Total production costs reflect all costs associated with the item, including both direct costs and an appropriately allocated share of indirect costs.

In selecting the method of determining costs in nursing units, account should be taken of the particular characteristics of the health unit, the quality of the information available and the purpose for which it is to be applied.

Moving on from cost allocation, we can construct a "care profile", which describes the resources required to provide care in the hospital setting.

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